

SCIENCE NEWS-LETTER

The Weekly Summary of Current Science
A SCIENCE SERVICE PUBLICATION

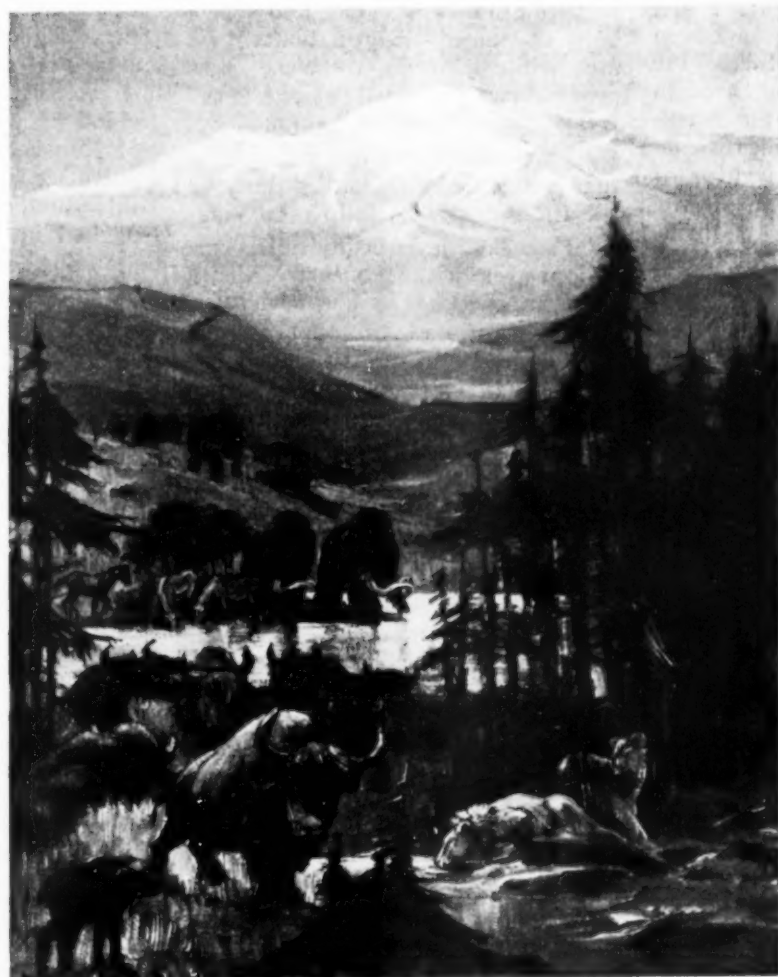


\$5 a Year

15c a Copy



September 6, 1930



LIONS AND ELEPHANTS IN ALASKA

Zoos of the North When There Were No Men to See Them

(See page 158)

Vol. XVIII

No. 491

Andrée Balloon Elaborately Equipped

Exploration

Swedish Statement of Interest While Diary Is Awaited

IN the diary of S. A. Andrée, Swedish balloonist and explorer, which is being brought back to civilization by a Norwegian expedition together with his body and those of his two companions found on White Island, Fridtjof Nansen Land, there may be contained the finishing chapters of the story of that daring attempt to reach the North Pole by balloon that began three decades before modern airplanes and airships carried out Andrée's dream.

For several years before the start from Dane's Island in Spitzbergen on July 11, 1897, Andrée had been laying plans for his venture. He presented his project to the Swedish Academy of Sciences and the International Geographical Congress in 1895. Alfred Nobel, the inventor of dynamite and the founder of the Nobel prizes, was one of the principal backers of the expedition which was estimated to cost \$36,000.

The balloon "Ornen" used in the ascension was built in Paris and cost over \$10,000. It held some 170,000 cubic feet of hydrogen gas and was made of three thicknesses of silk, varnished with a special preparation.

A heavy hemp netting encased the balloon and supported the car which was elaborately built of wicker and wood. Iron and steel were avoided in order not to affect the magnetic instruments carried. The car's interior was arranged so that one aeronaut could sleep at a time and around about in compartments were stored books, maps, instruments, toilet articles, kitchen utensils, arms, ammunition and other equipment. More freight was stowed in bags suspended from the balloon's bearing ring above the car and twelve bags contained sledges, boats, sails, etc., while in thirty-six were stored provisions.

An official Swedish statement issued after the party had failed to return after several months described the food supply as follows:

"The Andrée expedition has provisions for nine months. All the boxes in which the conserved food is kept were made of copper, as iron would have had a disastrous effect on the magnetic instruments carried by the expedition. To occupy as

little space as possible they were made square instead of round. The food consists of every kind of steaks, sausages, hams, fish, chickens, game, vegetables, and fruit. If these provisions have been saved, together with the food which the explorers can procure through fishing and hunting, they have sufficient provisions to last them two years.

"The expedition is also furnished with a new kind of lozenges of concentrated lemon juice. This is the first time these have been used by Polar expeditions, and it is expected they will absolutely prevent every attack of scurvy.

"Finally, the expedition is provided with 25 kilos (about 55 pounds) of thin chocolate cakes, mixed with pulverized pemmican. To preserve this food against dampness it is packed in parchment, covered with stannine, a brittle metal composed of tin, sulphur, and copper, and inclosed in air-tight boxes."

Science News-Letter, September 6, 1930

More Sun Spots

INCREASE in activity on the sun has been noted by Mt. Wilson astronomers at Pasadena, Calif., in recent days. On Thursday, August 21, there were three groups of spots visible through the telescope, with a total of five spots. The next day there were only two groups, but these contained 25 spots. On Saturday, there were three groups and 23 spots. Sunday, four groups and 18 spots and Monday the same number of groups with 16 spots. All of the groups, however, are too small to be seen with the naked eye through smoked glass.

Astronomy

Science News-Letter, September 6, 1930

The Answer Is In This Issue

Did *Alfred Nobel*, founder of the Nobel Prizes, give financial backing to the disastrous *Andrée North Polar Expedition*? p. 146—Where did astronomers see a *whole year* pass in *seven seconds* recently? p. 147—How may it be possible for *leprosy* to be fought and probably *cured with vitamins*? p. 148—Is your *mind* apt to become *diseased*? p. 149—Who was *Alexander von Humboldt*? p. 150—Why does Sir Hubert Wilkins think he can safely go to the *North Pole* in a *submarine*? p. 152—How does *freezing* change the *color* of canned fruits? p. 157.

all communications to Washington, D. C. Cable address: Scienserve, Washington.

Entered as second class matter October 1, 1926, at the postoffice at Baltimore, Md., under the act of March 3, 1879. Established in mimeographed form March 13, 1922. Title registered as trade-mark, U. S. Patent Office.

Subscription rate—\$5.00 a year postpaid, 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Special reduced subscription rates are available to members of the American Association for the Advancement of Science.

Flying Teachers

TEACHERS from New York University are to commute by airplane to other cities this winter in order to conduct extension courses. The experiment will be tried by the faculty of the School of Education at the University, officials of the school have announced. An airplane will be used for the teachers four days each week.

Four instructors will be carried by the plane each day to cities not readily reached from New York by railway or automobile. Leaving New York the pilot will stop at each city where one of his passengers has a teaching engagement, and the next morning he will return to pick up the passengers and return them to the University at time for their day's work there.

Education—Aviation

Science News-Letter, September 6, 1930



SCIENCE NEWS-LETTER, The Weekly Summary of Current Science. Published by Science Service, Inc., the Institution for the Popularization of Science organized under the auspices of the National Academy of Sciences, the National Research Council and the American Association for the Advancement of Science.

Edited by Watson Davis.

Publication Office, 1918 Harford Ave., Baltimore, Md. Editorial and Executive Office, 21st and B Sts., N. W., Washington, D. C. Address

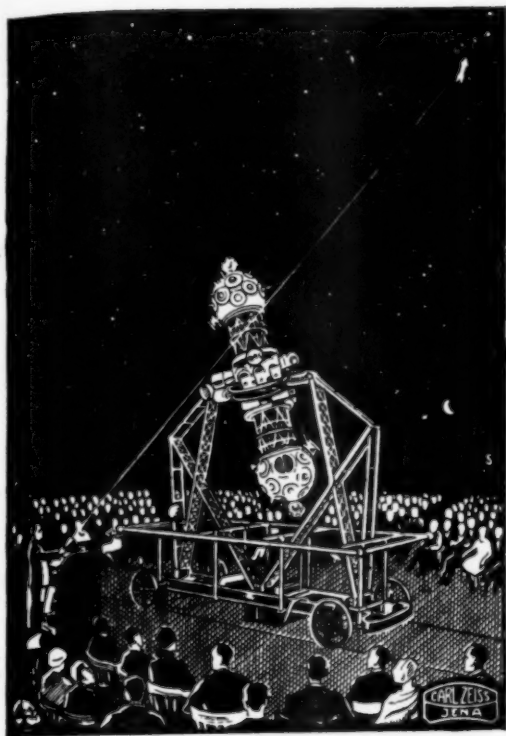
In requesting change of address, please send old as well as new address.

Advertising rates furnished on application.

Copyright, 1930, by Science Service, Inc. Publication of any portion of the SCIENCE NEWS-LETTER is strictly prohibited since it is contributed for personal, school, club or library use only. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service, details and samples of which will gladly be sent on request.

Have Astronomers Been Deceived by Distance To Far-Away Stars?

Astronomy



The Interior of a Planetarium

MUST our celestial distances of hundreds of thousands of light years shrink to tens of thousands? Dr. van de Kamp's studies at the Leander McCormick Observatory of the University of Virginia indicate that this may happen. Star light is absorbed by space, it is being found, and it is likely that this absorption was not sufficiently taken into account in the present calculations.

ASTRONOMERS attending the recent meeting of the American Astronomical Society in Chicago saw a whole year pass in seven seconds.

They were holding a session in the Adler Planetarium and Astronomical Museum, which has been opened on a small island just off the shore in Lake Michigan. Above was the planetarium dome on which images accurately and realistically reproducing the skies were being projected. But the familiar motions of the sun, moon and planets among the stars were being shown far more rapidly than they are ever observed in nature. In seven seconds they saw the planets go through their normal motions of a year. Even the "great year" of 26,000 ordinary ones, during which the Southern Cross and other southern constellations become visible from northern countries, was reproduced in a few minutes.

The planetarium instrument, that makes this possible, is a German invention that projects on a white dome 80 feet in diameter all the celestial objects visible to the naked eye and reproduces their motions. The one in the Adler Museum is the first to be erected in the United States, and this was the first time most of the American astronomers had seen it in operation.

OUR galactic system of stars, which includes all that we can see, may be considerably smaller than was previously supposed. Some of the most distant objects in this system, may be distant tens of thousands of light years, instead of hundreds of thousands. Even the former figure means distances of hundreds of quadrillions of miles, inconceivably great.

Dr. Piet van de Kamp, astronomer of Dutch birth now at the Leander McCormick Observatory of the University of Virginia, told of his researches on the absorption of light in space. It used to be assumed that all that was in the sky was what could be seen or photographed, with either small or large telescopes. Once a ray of light left a star, and started in our direction, it was supposed that it travelled right on without interference, as there was nothing between to stop it.

This assumption was called into question, however, because luminosity, and hence, visibility, is not a necessary attribute of celestial matter. Meteors are continually bombarding the earth, and they are dark and invisible until they are heated to incandescence by the friction with the earth's atmosphere. Huge dark areas have been observed in many parts of the sky, and are almost certainly due to dark masses blotting out the bright material beyond. In addition, space may be full

of fine cosmic dust that would absorb light something like a cloud of smoke.

The light of a series of objects at different distances varies according to the famous inverse square law, that is, the brightness is inversely proportional to the square of the distances. Therefore a light which appears to be of a brightness of one candlepower at four meters would appear only one quarter as bright at a distance of eight meters, and not one half as bright. The light would vary in the proportion of 16 to 64 and not of 4 to 8. But if you observed the two lights at different distances in a corridor filled with smoke, the farther one would be fainter than you would expect from the inverse square law, because the longer path over which the light travelled would cause more of it to be absorbed.

If you knew two lights at different distances to be of the same actual brightness, you could estimate their relative distance by estimating how much fainter the more distant one is. But if there is smoke between, then the distant light will seem fainter than it should, and so you will over-estimate its distance.

This principle is used by astronomers to measure the distance of far away stars. Nearer ones can be measured by the displacement they seem to undergo as they are observed

from opposite sides of the earth's orbit, 186,000,000 miles apart. But there are various ways of determining the actual brightness, or candle-power, of a star, such as a measurement of the intensity of certain of the dark lines in its spectrum. Such measures have been used as the basis for distance determinations of very distant stars. Direct photographs have shown how bright they appear, the spectrum shows how bright they really are and the difference has been interpreted as being due to the distance. But if there is absorbing matter in space, then the star would appear fainter than it ought, while the absolute brightness would be the same, and the distance so determined would be too large.

Evidence of Absorption in Space

In recent work at the Lick Observatory of the University of California, Dr. R. J. Trumpler has found good evidence that there actually is some absorption in inter-stellar space. He has studied some of the open star clusters and, by assuming that clusters of the same constitution have approximately the same linear dimensions, he concludes that within our Milky Way system light is absorbed at the rate of .67 of a magnitude in 1000 parsecs. The parsec is the astronomer's measuring stick, and is equal to 206,265 times the distance from the earth to the sun, or 19,200,-

000,000,000 miles. Another way of expressing the absorption calculated by Dr. Trumpler would be to say that 39 per cent. of the light is absorbed every time it travels a thousand parsecs.

This rate of absorption refers to the light that affects a photographic plate, the shorter waves of the blue and ultraviolet. The longer waves of yellow light that we mostly see by are only absorbed about half as much. But measures of star magnitudes, used in determining distances, are mainly by photography, so the higher figure is the one to be considered. He also found that the absorption takes place mainly in the region of the Milky Way. Our system of stars is approximately the shape of a grindstone and we are somewhere near the center. When we look towards the edge of the grindstone we look through a much greater depth of stars than when we look to the sides. This concentration of stars to the edge causes the appearance of the Milky Way. The fact that the absorption takes place mainly in this region suggests that the absorbing stuff is distributed in the form of a thin sheet through the middle of the grindstone.

Blue Light Rapidly Lost

Dr. van de Kamp, who has been working on the same problem independently, confirms Dr. Trumpler's results. He has studied a number of

stars of spectral types B and A, which are bluish in color. But he finds that the farther away they are, the less bluish they appear. As there is no reason to suppose that the color of their light actually varies, depending on how far they are away from us, he concludes that their light is absorbed in its passage, and that the blue light is absorbed more rapidly than the red, or longer waves. He believes also that the absorbing stuff is concentrated in a thin sheet in the plane of the Milky Way, and agrees with Dr. Trumpler that it is probably about 175 parsecs in thickness.

Dr. Harlow Shapley, director of the Harvard College Observatory, in a study made a few years ago of nebulae which are completely outside our galactic system, came to the conclusion that their light was not absorbed appreciably. Evidently space outside our system is quite transparent. As none of these nebulae are observed in the direction of the Milky Way, the absorption of their light after it reaches our system would be negligible. Hence the vast distances determined for those objects, tens of millions of parsecs, are still apparently valid. But the distance of stars in our own system, and in the direction of the Milky Way may have to be modified considerably. Dr. van de Kamp estimates that stars really only 5,000 or 10,000 parsecs away, for example, would seem to be at 23,000 and 220,000 parsecs respectively, when no allowance is made for absorption.

Fighting Leprosy With Vitamins

Medicine

HOPE that one of the world's oldest and most loathsome scourges may be conquered is contained in reports from Japan that Dr. K. Shiga, bacteriologist and dean of the Imperial Medical Faculty at Seoul, Korea, has discovered that vitamins in sufficient amounts will prevent infection of animals, and presumably men, with leprosy.

Although the leprosy bacillus was discovered in leprosy sores of persons afflicted with the disease more than 50 years ago, it has hitherto not been possible to transmit leprosy to lower animals by inoculation. A solitary case of experimental transfer of the disease from man to man, from a leper to a condemned criminal in the Sandwich Islands, was not regarded as convincing evidence, because the convict had other opportunities of contracting the disease. After many futile attempts to reproduce leprosy experimentally, scientists were forced to

assume that a special individual susceptibility to the disease is requisite for its production.

This old assumption of the necessity of individual susceptibility to leprosy is now verified by Doctor Shiga. When he injected leprosy bacilli taken from human leprosy sores into normal, healthy rats, the animals remained normal and showed no signs of the disease. They were not "susceptible" to leprosy. Later, however, after the food of the animals had been deprived of vitamins, they soon developed leprosy sores and became victims of the disease. They had become "susceptible."

If such a simple dietary deficiency accounts for animal or human susceptibility to leprosy, then it will be possible to protect people from leprosy by merely watching their bill of fare and perhaps even to cure lepers by adding vitamins to their food.

Science News-Letter, September 6, 1930

Dust, Meteors, Electrons . . . ?

In his report to the Astronomical Society, Dr. van de Kamp did not make any suggestions as to the nature of the absorbing stuff. Dr. Trumpler, however, recently suggested that in addition to fine cosmic dust and large meteors, it might consist of free electrons, or pieces of atoms that have become ionized and had some of their electrons removed, and free atoms, of calcium, sodium and other elements. There is other evidence for highly rarefied clouds of calcium floating around between the stars.

Science News-Letter, September 6, 1930

All the states except two now have laws permitting municipalities to control the use, height, and area of buildings by district or zones.

The busy honeybee sometimes flies eight miles to gather honey, and then flies eight miles back to the hive.

Your Chances of Being Stricken By a Mental Disease

Psychiatry

IF you are going to be sick, the chances are nearly as great that you will have some mental ill as they are of your having some other ailment. Speaking under the auspices of Science Service in a radio talk through a nation-wide network of the Columbia Broadcasting System, Dr. William A. White, superintendent of St. Elizabeth's Hospital, Washington, D. C., and nationally-known psychiatrist, pointed out that mental disease is not nearly so rare as once was thought.

After explaining how the present century has given birth to the mental hygiene movement, and new facts are continually being learned about the treatment of insanity and lesser mental troubles, Dr. White said:

Need Not Be Insane

"Many of you who are listening to me will undoubtedly say to yourselves, 'This is all very interesting but what application has it to me? I am not insane, I do not expect to become insane, there is no insanity in my family, my friends and acquaintances are all self-sustaining, mentally well individuals so far as I know. This whole matter is one only for the exceptional individual, who will be adequately cared for by the means that are provided by the state and a few private hospitals.' If this is your conception of the significance of the problem of mental illness, may I say to you at once that you are quite wrong.

"Today the number of beds in hospitals for mental disease throughout the United States is very nearly as great as the number of beds in all other types of hospitals combined; and a recent report shows that of the beds under construction there are actually more beds being built right now for mental diseases in the United States than for all other diseases put together. In other words, you are certainly occasionally sick, almost every one of you, and these figures would indicate that you have on the whole pretty nearly as much of a chance of being mentally sick as you have of being sick in any other way.

"Fortunately, this statement is not quite true, because while there are as

many beds in mental hospitals as there are in all the others, the number of patients that pass through these beds is much less because the patients stay on an average very much longer in the mental hospitals than they do in the general hospitals. Nevertheless, when I tell you that the statistics recently compiled of New York State, which I may remind you contains approximately ten per cent. of the population of the United States, show that of the residents of that state one person in every twenty-two over the age of fifteen spends a certain portion of his time in a hospital for mental disease during the course of a generation, you will begin to see the significance of mental disease and to realize that after all you individually may not be as immune as you have been wont to think.

No One Is Immune

"Therefore mental illness is not rare, is not exceptional, it is not something which may not affect you individually or those whom you may love. No one is immune; and I have no doubt that many of your friends and many of the families the members of which you know could tell you of cases of mental illness which they know about or which are actually present in their own families, if they would. Let me add to this somewhat startling picture the fact that the number of patients in public institutions for mentally ill has increased something like three hundred per cent. in the last century.

"This does not mean necessarily that mental disease itself has increased at any such rate. It is partly an expression of the increasing confidence of the public in the mental hospital. But it is nevertheless a somewhat alarming state of affairs, especially when I tell you that according to the statisticians we are due to keep this rapid rate of increase for the next half century at about the same pace that it has been occurring during the past fifty years."

Dr. White described some of the ways in which mental hygiene is benefiting mankind.

"Man is applying his ingenuity," he said, "in attempting to discover

answers to the questions that have puzzled him for generations: why do people become mentally ill? Why do they become criminals? What is the meaning of unhappiness and discontent. How can habits that are destructive be modified. How can the energies that are being poured into useless activities be recaptured for the common good?

"As difficult as some of these questions may seem, as unanswerable as they may appear, it is nevertheless true that we are moving in the direction of better and better solutions; that progress is being made, slowly perhaps but, after the manner of science, with certainty; that the domain of false ideas and traditions, of superstitions and taboos, of nameless fears, of destructive tendencies—that the domain of these hobgoblins of the mind is being gradually invaded, that they are being studied with the purpose of their modifications and ultimate conquest."

Science News-Letter, September 8, 1930

All About Weights

A WEIGHTS and measures library of about 1,200 volumes and 700 pamphlets and containing works from 1520 to the present time has been given Columbia University by Samuel S. Dale, of Boston, former editor of the "Textile World Record" and an authority on weights and measures.

Nineteen languages are found in the collection, which is the result of Mr. Dale's interest in the controversy over the proposed adoption of the metric system in the United States. It represents the accumulation of thirty years research in this country and abroad to bring together, the donor announced, "as far as possible a copy of every book, pamphlet, government document, and other printed or written matter dealing with the origin, history, development and science of weights and measures that has ever been issued in any language at any time."

Standards

Science News-Letter, September 6, 1930

Some of the mountains over which the famous Chinese wall was built ranged as high as 5,000 feet.

Unity of the Universe —A Classic of Science

Cosmography

COSMOS: A Sketch of a Physical Description of the Universe. By Alexander von Humboldt. Translated from the German by E. C. Otté. London, 1849.

IT remains to be considered whether, by the operation of thought, we may hope to reduce the immense diversity of phenomena comprised by the Cosmos to the unity of a principle and the evidence afforded by rational truths. In the present state of empirical knowledge, we can scarcely flatter ourselves with such a hope. Experimental sciences, based on the observation of the external world, cannot aspire to completeness; the nature of things, and the imperfection of our organs, are alike opposed to it. We shall never succeed in exhausting the immeasurable riches of nature; and no generation of men will ever have cause to boast of having comprehended the total aggregation of phenomena. It is only by distributing them into groups, that we have been able, in the case of a few, to discover the empire of certain natural laws, grand and simple as nature itself. The extent of this empire will no doubt increase in proportion as physical sciences are more perfectly developed. Striking proofs of this advancement have been made manifest in our own day, in the phenomena of electro-magnetism, the propagation of luminous waves and radiating heat. In the same manner, the fruitful doctrine of evolution shows us how, in organic development, all that is formed is sketched out beforehand, and how the tissues of vegetable and animal matter uniformly arise from the multiplication and transformation of cells.

The generalization of laws, which being at first bounded by narrow limits, had been applied solely to isolated groups of phenomena, acquires in time more marked gradations, and gains in extent and certainty, as long as the process of reasoning is applied strictly to analogous phenomena; but as soon as dynamical views prove insufficient where the specific properties and heterogeneous nature of matter come into play, it is to be feared that

Alexander von Humboldt was an early popularizer of science. He brought new discoveries in geology into harmony with the better known sciences and presented science as a whole to "the intelligent layman" in his lectures and books. Behind the barrier of stilted Mid-Victorianese we can still make out the broad panorama of the field of science which he spread out before his contemporaries.

by persisting in the pursuit of laws we may find our course suddenly arrested by an impassable chasm. The principle of unity is lost sight of, and the guiding clue is rent asunder whenever any specific and peculiar kind of action manifests itself amid the active forces of nature. The law of equivalents and the numerical proportions of composition, so happily recognized by modern chemists, and proclaimed under the ancient form of atomic symbols, still remains isolated and independent of mathematical laws of motion and gravitation.

Those productions of nature which are objects of direct observation may be logically distributed in classes, orders and families. This form of distribution undoubtedly shed some light on descriptive natural history, but the study of organized bodies, considered in their linear connection, although it may impart a greater degree of unity and simplicity to the distribution of groups, cannot rise to the height of a classification based on one sole principle of composition and internal organization. As different gradations are presented by the laws of nature according to the extent of the horizon, or the limits of the phenomena to be considered, so there are likewise differently graduated phases in the investigation of the external world. Empiricism originates in isolated views, which are subsequently grouped according to their analogy or dissimilarity. To direct observation succeeds, although long afterwards, the wish to prosecute experiments,—that is to say, to evoke phenomena under different determined conditions. The rational experimentalist does not proceed at hazard, but

acts under the guidance of hypotheses founded on a half indistinct and more or less just intuition of the connection existing among natural objects or forces. That which has been conquered by observation or by means of experiments, leads, by analysis and induction, to the discovery of empirical laws. These are the phases in human intellect that have marked the different epochs in the life of nations; and by means of which that great mass of facts has been accumulated which constitutes at the present day the solid basis of the natural sciences.

Two forms of abstraction conjointly regulate our knowledge, namely, relations of quantity, comprising ideas of number and size, and relations of quality, embracing the consideration of the specific properties and the heterogeneous nature of matter. The former, as being more accessible to the exercise of thought, appertains to mathematics, the latter, from its apparent mysteries and greater difficulties, falls under the domain of the chemical sciences. In order to submit phenomena to calculation, recourse is had to a hypothetical construction of matter, by a combination of molecules and atoms, whose number, form, position, and polarity determine, modify, or vary phenomena.

The mythical ideas long entertained of the imponderable substances and vital forces peculiar to each mode of organization, have complicated our views generally, and shed an uncertain light on the path we ought to pursue.

The most various forms of intuition have thus, age after age, aided in augmenting the prodigious mass of empirical knowledge, which in our own day has been enlarged with ever increasing rapidity. The investigating spirit of man strives from time to time, with varying success, to break through those ancient forms and symbols invented, to subject rebellious matter to rules of mechanical construction.

We are still very far from the time when it will be possible for us to reduce, by the operation of thought,

all that we perceive by the senses, to the unity of a rational principle. It may even be doubted if such a victory could ever be achieved in the field of natural philosophy. The complication of phenomena, and the vast extent of the Cosmos, would seem to oppose such a result; but even a partial solution of the problem,—the tendency towards a comprehension of the phenomena of the universe,—will not the less remain the eternal and sublime aim of every investigation of nature.

In conformity with the character of my former writings, as well as with the labours in which I have been engaged during my scientific career, in measurements, experiments, and the investigation of facts, I limit myself to the domain of empirical ideas.

The exposition of mutually connected facts does not exclude the classification of phenomena according to their rational connection, the generalization of many specialities in the great mass of observations, or the attempt to discover laws. Conceptions of the universe solely based upon reason and the principles of speculative philosophy, would no doubt assign a still more exalted aim to the science of the Cosmos. I am far from blaming the efforts of others solely because their success has hitherto remained very doubtful. Contrary to the wishes and counsels of those profound and powerful thinkers, who have given new life to speculations which were already familiar to the ancients, systems of natural philosophy have in our own country for some time past turned aside the minds of men from the graver study of mathematical and physical science. The abuse of better powers which has led many of our noble but ill-judging youth into the saturnalia of a purely ideal science of nature has been signalised by the intoxication of pretended conquests, by a novel and fantastically symbolical phraseology, and by a predilection for the formula of a scholastic rationalism, more contracted in its views than any known to the middle ages. I use the expression "abuse of better powers," because superior intellects devoted to philosophical pursuits and experimental sciences have remained strangers to these saturnalia. The results yielded by an earnest investigation in the path of experiment, cannot be at variance with a true philosophy of nature. If there be any contradiction, the fault must lie either in the un-

soundness of speculation, or in the exaggerated pretensions of empiricism, which thinks that more is proved by experiment than is actually derivable from it.

External nature may be opposed to the intellectual world, as if the latter were not comprised within the limits of the former; or nature may be opposed to art when the latter is defined as a manifestation of the intellectual power of man; but these contrasts, which we find reflected in the most cultivated languages, must

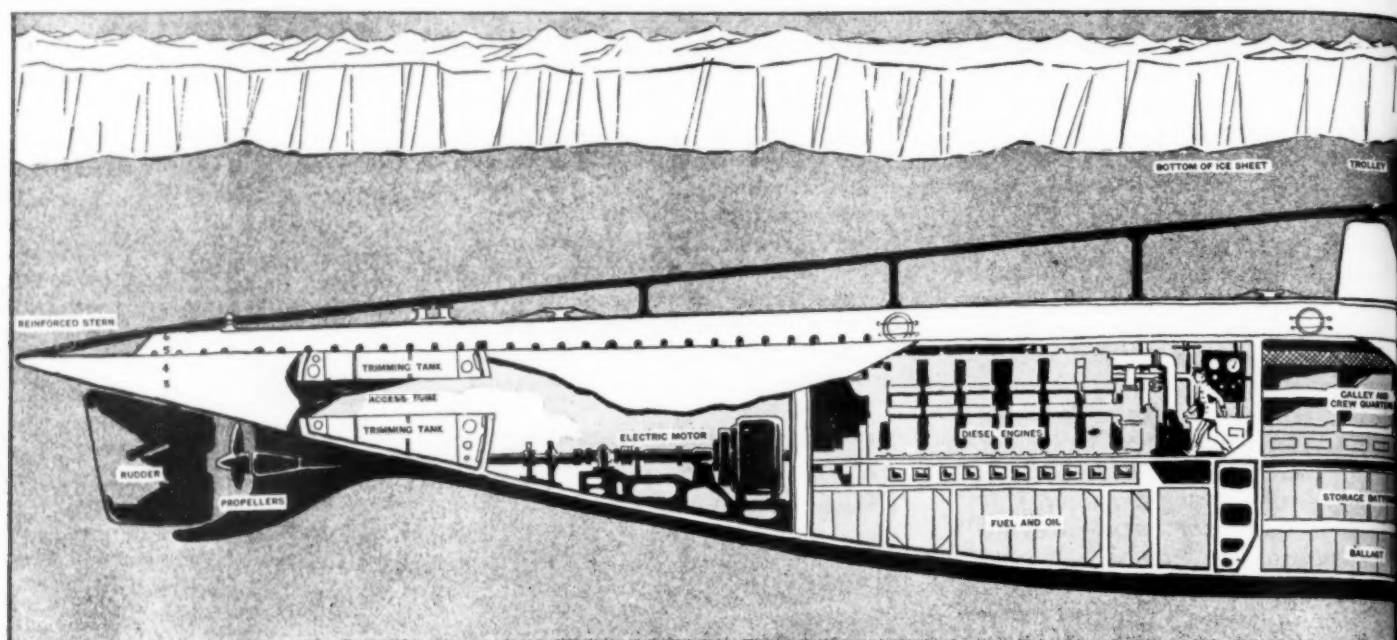


Alexander von Humboldt

not lead us to separate the sphere of nature from that of mind, since such a separation would reduce the physical science of the world to a mere aggregation of empirical specialities. Science does not present itself to man, until mind conquers matter, in striving to subject the result of experimental investigation to rational combinations. Science is the labour of mind applied to nature, but the external world has no real existence for us beyond the image reflected within ourselves through the medium of the senses. As intelligence and forms of speech, thought and its verbal symbols, are united by secret and indissoluble links, so does the external world blend almost unconsciously to ourselves with our ideas and feelings. "External phenomena," says Hegel in

his *Philosophy of History*, "are in some degree translated in our inner representations." The objective world, conceived and reflected within us by thought, is subjected to the eternal and necessary conditions of our intellectual being. The activity of the mind exercises itself on the elements furnished to it by the perceptions of the senses. Thus in the early ages of mankind there manifests itself in the simple intuition of natural facts, and in the efforts made to comprehend them, the germ of the philosophy of nature. These ideal tendencies vary, and are more or less powerful, according to the individual characteristics and moral dispositions of nations, and to the degrees of their mental culture, whether attained amid scenes of nature that excite or chill the imagination. . . .

It cannot be denied, that in this process of thought the results of experience have had to contend with many disadvantages; we must not therefore be surprised if in the perpetual vicissitude of theoretical views, as is ingeniously expressed by the author of Giordano Bruno, "most men see nothing in philosophy but a succession of passing meteors, whilst even the grander forms in which she has revealed herself share the fate of comets, bodies that do not rank in popular opinion amongst the eternal and permanent works of nature, but are regarded as mere fugitive apparitions of igneous vapour." We would here remark that the abuse of thought and the false track it too often pursues, ought not to sanction an opinion derogatory to intellect, which would imply that the domain of mind is essentially a world of vague fantastic illusions, and that the treasures accumulated by laborious observations in philosophy are powers hostile to its own empire. It does not become the spirit which characterises the present age, distrustfully to reject every generalization of views, and every attempt to examine into the nature of things by the process of reason and induction. It would be a denial of the dignity of human nature and the relative importance of the faculties with which we are endowed, were we to condemn at one time austere reason engaged in investigating causes and their mutual connections, and at another that exercise of the imagination which prompts and excites discoveries by its creative powers.



Under the Top of the World By Submarine

Exploration

THERE IS far more significance to a submarine voyage across the Arctic Ocean than the thrilling satisfaction of beating Jules Verne at his own game. Next year's expedition will increase the scientific knowledge of the North Polar region as could be done in no other way. In an interview given for this article, a veteran explorer tells how this will be done.

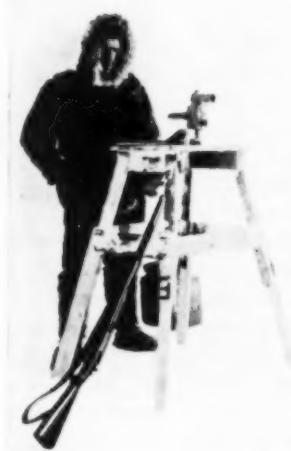
By J. W. YOUNG

DISTANT, cold and unmapped is the Arctic ocean. Yet it is very likely that by the end of next summer scientists will know more about this bleak sea than about any of the other great bodies of water in the more favored climates of the world.

This knowledge will come from the first submarine expedition into the Polar regions now being definitely planned for July and August of

1931 by the intrepid British explorer, Captain Sir George Hubert Wilkins. Sir Hubert has distinguished himself by Polar exploration afoot, he has flown far into the Antarctic and across North Polar regions, and now he is daring to penetrate the third dimension of discovery.

Lincoln Ellsworth, American, who has spent much of his life in the Arctic, will be associated with the venture, which is called the Wilkins-



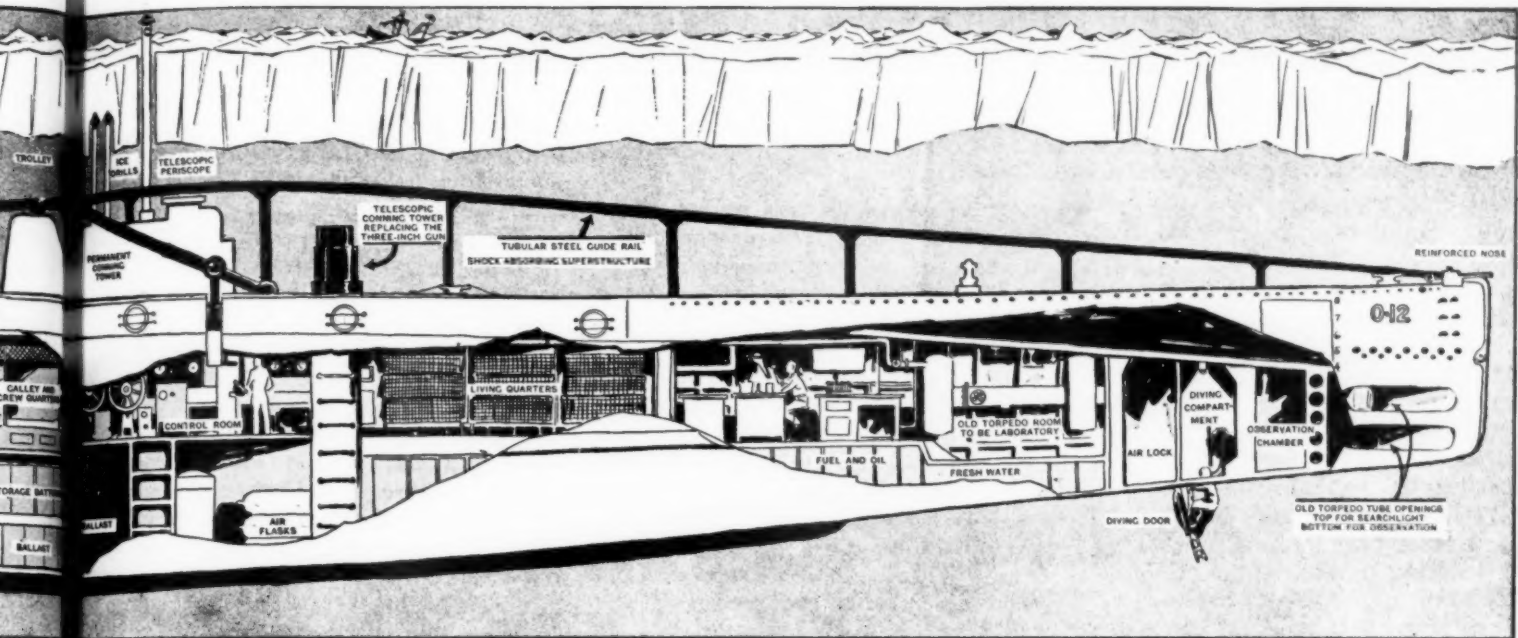
A Scientist in the Arctic

Ellsworth Transpolar Submarine Expedition. Sir Hubert has announced. But it is not known yet whether Mr. Ellsworth will actually make the trip. He will decide next month after he returns from exploring the unknown headwaters of the Hamilton river in Labrador.

While the mind of the layman immediately visions insurmountable difficulties and final disaster to a submarine traveling beneath the

Arctic ice, many leading scientists and authorities on this region have commended the proposed expedition as being entirely safe and practicable and promising princely returns of scientific knowledge.

It is said that the expedition will be safe because Sir Hubert plans to use a submarine especially adapted for navigation beneath the ice. It will be equipped with devices for traveling safely under the ice and for



As the submarine Nautilus, now the O-12 of the U. S. Navy, will appear when reconditioned for a voyage of scientific exploration across the Arctic ocean next July and August

coming to the surface through the thick floes. Moreover, the Arctic is not as cold and as dangerous in the summer as popular imagination pictures it.

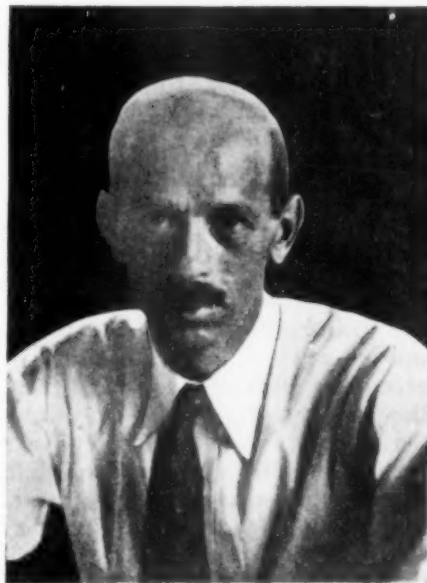
An immensely valuable store of scientific knowledge will be gathered because a submarine is large enough to carry to inaccessible regions many scientific instruments, and remain there in safety for days while observations are being made.

The project is not at all new, for a submarine was successfully operated under the ice years ago. The chief proponent of this form of navigation is Simon Lake, the famous submarine inventor.

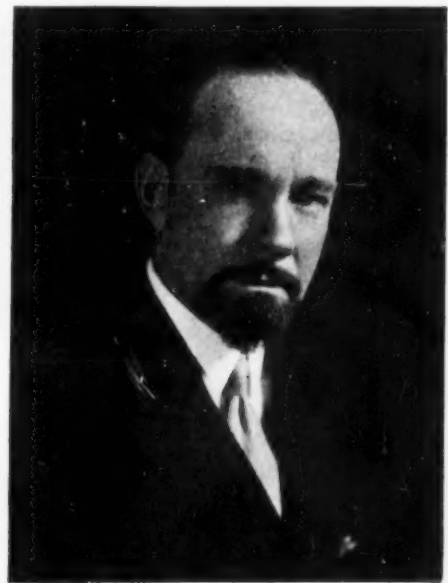
Early Under-Ice Craft

As early as 1897 Lake read a paper on the advisability of such a trip before a group of scientists at Johns Hopkins University. Later, during the Russo-Japanese War, he built several successful under-ice submarines for Russia and navigated similar vessels under ice in this country.

The submarine of the present expedition will be mastered by the experienced Lieut. Comm. Sloan Danenhower, a graduate of the U. S. Naval Academy and a former officer in the Naval Reserves. Comm. Danenhower has had no Arctic experience but he knows the sea and underwater craft. He was with the



Dr. Harald U. Sverdrup, to direct the scientific work



Sir George Hubert Wilkins, leader of the expedition

Navy a few years after graduation from Annapolis and during the World War, and even in civilian life his activities have concerned submarines and salvaging vessels from the sea bottom. Last summer, as trial captain for inventor Lake, Comm. Danenhower conducted tests on the "Defender" for the U. S. Navy to find ways of making submarines safer.

It may be that the call of the North he is answering now comes from father to son; for the father,

Lt. J. W. Danenhower, also of the U. S. Navy, was one of the few survivors of the disastrous yet important De Long expedition in 1879-1881. This expedition drifted with the pack ice in the "Jeanette" north of Wrangell Island off the coast of Siberia thereby exploding the theory of a continent being in that part of the Arctic.

On the other hand, Dr. Harald U. Sverdrup, who is expected to direct the scientific studies of the expedition, is a veteran of the Arctic. His

most important activities in the far north were accomplished when he had charge of scientific work on Amundsen's six-year expedition in the "Maud."

Open Summer Seas

Dr. Sverdrup says his years of Arctic experience assure him that during the summer months of July and August the Polar sea is so open that it will not be possible for the submarine to go five miles in any direction without finding a clear space in the water overhead. The sea water is not freezing then, its temperature being just below the freezing point of fresh water and just above that of salt water, and the atmosphere is also just above the freezing point.

Sir Hubert is, of course, equally as certain as Dr. Sverdrup of finding plenty of places where his submarine can rise to the surface. When he appeared before the American Geophysical Union recently, to explain his plans and ask the opinion of the American scientists, he said:

"My experience of 15,000 miles of Arctic flying and 5,000 miles of walking over ice shows me that there are patches of water in the Arctic even in winter. It will be recalled that Amundsen landed two seaplanes only 90 miles from the Pole and dragged one up on a cake of ice and took off in it."

Protected from above by a shock-absorbing super-structure and by reinforcements on the bow and stern, the submarine will travel slowly below the ice held against the bottom of the pack by a slight positive buoyancy, Comm. Danenhower explains. In his submarine work he has already operated vessels in this manner along the irregular floor of the ocean at slight negative buoyancy to keep them down.

A trolley-like apparatus attached to the top of the submarine will fly up through very thin ice or in open water to indicate where the vessel can rise between the floes. But if this indicates no open space, a thin spot will be picked out by the amount of light that comes through the ice into the water below.

The exact thickness of the ice above the submarine can be determined instantly by comparing the position of the trolley with the depth indicator reading.

When all the water ballast is pumped out, the upward force of the

submarine exerting a pressure of 150 tons should then be able to tear through the soft summer ice, Sir Hubert believes. It is not thought that the soft summer ice sheet can stand an upward pressure of more than 25 tons.

But if this fails, a circular saw will cut an opening above the conning tower, and compressed air will blow away the loosened ice, or electric heating units will melt the core. Then the telescopic tower will be extended to the surface so the men can come out on the ice and bring scientific apparatus with them.

In addition, there are to be several seven-inch drills and smaller two-inch drills with which the surface can be reached, Sir Hubert explains. Through holes made by the drills air will be brought the engine for recharging the batteries so the submarine can begin another trip of more than 100 miles without coming up. But if it is desired to take observations at that point, the holes will be filled with chemicals which will quickly melt the ice and bring the vessel to the surface. Men will be able to come to the surface through 10 feet of ice while holes for air can be driven through as much as 50 feet.

Dynamiting Through

"If engineers can drill thousands of feet into the ground for oil, why can't we drill through a few feet of ice?" Sir Hubert asks. But drilling and ice sawing may be entirely unnecessary, even in emergency. Probably the best way to break through the ice will be to send divers from the submarine with explosives. These heavy charges will be attached to the bottom of the sheet and set off from a distance by electricity to tear gaping holes in the thickest floes.

The submarine O-12 of the U. S. Navy, rechristened the Nautilus, which has been on the de-commission list for four years, is being remodeled for the expedition. This work is being done by Lake and Danenhower, Inc., to whom the vessel has been chartered for one dollar a year. The first named partner is the inventor Lake, whose firm built the O-12 in 1916 and 1917.

The Nautilus is a small vessel as modern submarines go, having a surface displacement of only 485 tons and a submerged displacement of 566 tons. Most submarines built in re-

cent years displace 2,000 tons and more.

The cruising radius of the submarine on the surface of the water is 3,000 miles with a normal supply of fuel and 5,500 miles with emergency fuel. Submerged she can travel only nine miles at full speed and 75 miles at two knots. But when stripped of her fighting equipment and after her engines have been reconditioned she will be able to travel at least 125 miles under water and her speed will be stepped up.

In Navy use, the O-12 carried one officer and 30 enlisted men. She mounted a three-inch gun and had four torpedo tubes. Her length is 175 feet, greatest breadth a little more than 16 feet and maximum draft nearly 14 feet. The fighting equipment will be removed and she will be completely rebuilt and fitted with novel apparatus for the expedition.

For the North Pole trip there will be an operating staff of 12 and a scientific staff of six. Two of the submarine's four torpedo tubes will be turned into powerful focusing search lights and the other two will be used as observation windows. She will also have a decompression chamber from which men can emerge in diving suits even though the vessel is far under water. A television transmitter as well as the usual radio sending and receiving sets will be carried.

Little danger is anticipated from ice projecting down into the water. There are no icebergs of any great size in the Arctic. Large pressure ridges have been observed only near the coast and the deepest of these extend not more than 100 feet beneath the sea.

Bottom Like The Top

If they are encountered the submarine can easily descend to that depth and pass under them. Even if they are not observed in time and are hit full on, the reinforced bow will protect the ship from damage.

Dr. Sverdrup says the bottom of the ice field is very much like its surface. It is rough but only to the extent of small irregularities beneath which the submarine will be able to slide easily. The deepest projections of ice along the route of the submarine are not expected to exceed 30 feet, while their average depth is thought to be only 10 feet.

Unlike all other Arctic explorers, it will be the problem of the men in the submarine to keep cool rather than warm. The electric motors and Diesel engine will run up the temperature of the close atmosphere well above that of the water outside.

The ship will cover the least known part of the Arctic traveling in a straight line from Spitsbergen to Alaska. The distance is 2,200 miles but it may be that only 2,000 miles will lie through ice fields. Two hundred miles north of Spitsbergen is well within the eighty-second parallel of latitude and only about 500 miles from the Pole. The great unknown territory to be explored lies on the other side of the Pole, toward Alaska.

This route is the same that Amundsen took with the airship "Norge," but far more valuable information will be collected on the two-month under-water trip than Amundsen could gather on his short air dash of a few hours' duration.

Some scientific work can be carried on while the submarine is actually in motion under the ice. Most of it, however, will be accomplished when the vessel comes to the surface at approximately 50-mile intervals. Let Dr. Sverdrup, himself, tell what is to be done:

Deep Sea Work

"The most important of the scientific studies to be made is the deep sea work. Temperatures will be measured and samples of sea water will be taken at different depths to be analyzed for its salt and chemical content.

"All we know about the currents of the Arctic ocean comes from observations made by Nansen when instruments were by no means as accurate as they are now. We need definite information about the Polar sea to understand the currents of the North Atlantic. One branch of the Gulf stream enters the Arctic north of Spitsbergen as a deep sea current, and a surface current comes out of the Arctic along the coast of Greenland and joins the Labrador current. Scientists want to know what happens to these currents in the Arctic ocean.

"These are the only currents of any consequence that enter or leave the Arctic. Elsewhere the entrances to this ocean are too shallow to permit the passage of much water.

"To collect plant and animal life

of the cold waters the submarine will probably carry an inverted mast on her bottom. Nets will be attached to it and allowed to trail in the water. Results of these findings should help to clear up the great differences of opinion that exist as to plant and animal life in Arctic waters.

"Some explorers think that seals and polar bears are abundant all over the Arctic sea while others believe these animals exist in quantity only near the coasts and are



Lieut. Comm. Sloan Danenhower, captain of the Nautilus

scarce in the central part of the region. In my opinion lack of sufficient light in the Polar sea is unfavorable to the development of plant organisms, and where there are no plants animals will not find nourishment. Definite conclusions will undoubtedly be reached as a result of this expedition.

"Collection of samples of ooze and mud from the bottom can be carried on better from a submarine in the Arctic than from a surface craft in other waters, because the submarine remains absolutely still. The wire will not be snapped by the roll of the vessel as often happens in other cases.

"An apparatus is dropped overboard and it falls rapidly to the bottom and penetrates it three or four feet. When withdrawn it brings up a core several inches in diameter which shows bottom deposits layer by layer. From them scientists can

delve into the history of the ocean for many thousands of years, because these deposits are made extremely slowly.

To Measure Gravity

"Another observation to which the submarine is especially well adapted is that of measuring the force of attraction of the earth's gravity. This is a very delicate measurement made by accurately timing the strokes of a pendulum. The pendulum swings fastest where gravity is strongest and will indicate a very slight change of its force. Of course, the rolling of a ship keeps the pendulum strokes from being uniform, but in a submarine there will be no trouble from this source.

"In fact, the observations can be made best while the ship is submerged. This has been done in other parts of the world by scientists in search of an almost stationary position on the ocean.

"Gravity readings taken elsewhere show that the material under the oceans is apparently more dense than that of which the continents are made. The great density of the ocean bottom probably balances the lighter water above. These readings from the Arctic are anxiously awaited by the scientific world to see if they will verify this theory.

"Magnetic observations must be made at a distance of at least 100 yards from the submarine so they will not be affected by its iron and steel. They will show the deviation of the compass needle from its true direction, a knowledge that is important in all kinds of navigation. It will be essential to know these deviations if commercial aviation across the Arctic between America and Europe ever becomes a reality.

Magnetic Observations

"Magnetic observations of the Polar region are just as important to the scientists as those of any other part of the world, and now there is a big gap across the Arctic ocean. It can be filled by observations of the submarine. This is the same kind of information the ill-fated "Carnegie" gathered from all oceans. The "Carnegie," however, was a non-magnetic ship and accurate readings could be taken aboard her.

"Of course, the first observation to be made at any stop is that of position. This is necessary both for navigation and (Turn to page 159)

Archaeological Forest is Studied

Botany

Scientist Finds What Happened To It During 100,000 Years

THE archaeology of a forest, to match the archaeology of the human settlements that nestled in and around it and depended on it for food, houses and fuel, has been traced for a hundred thousand years or more by Dr. T. W. Woodhead, well-known British scientist. Dr. Woodhead has prepared a series of model maps of the area he studied, and he displayed them at the Congress.

The forest in which Dr. Woodhead was interested lies on the southern Pennines, a range of low mountains running northward through north central England. They were not entirely submerged by the ice of the glacial period, but raised their summits through the sheet like the present "nunataks" of Greenland. The first model shows the bleak landscape of that period, with only meager mosses and ferns on the ground, and low scrub growths of birch and willow above them. The Arctic Circle had moved south to England, so far as the plants were concerned, and until a milder climate set in no men appeared in that part of the land. The earliest flint implements found there are of the Aurignacian type, used by comparatively advanced Stone Age men.

The coming of a milder climate brought heather and grass, such as are now found in the Scottish highlands. But though the climate was milder it was drier, so that a rich vegetation could not develop. Then improved moisture conditions set in, and at last a forest came into being: alders and willows in the swamps, oaks and hazels on higher land, with birches and heath in places. Here were found the first evidences of Stone Age man, tools resembling types found in Belgium.

With the coming of New Stone Age time the climate became, paradoxically, too moist for forest, and the upland degenerated into a peaty morass. The lower slopes still supported a mixed forest. Bronze Age time brought a somewhat drier climate again, but the wet-land conditions persisted nevertheless on the plateau.

From this time on, the changes in the vegetation on the hills were influenced more by the activities of man

More interesting reports from the International Botanical Congress held at Cambridge, England, are published with this article.

than by the climate alone. There are abundant evidences of human occupation, in roads and trackways, earthworks and Roman camps.

The first definitely dated reference in history is in the Domesday Book, the great census record of 1086 A.D. This tells of hills covered with peat-moss, birch-heath woods on the higher slopes, plowlands and pastured woodlands on the spurs, alder-willow thickets in the swamps and river bottoms.

Modern times show a further encroachment on the forest by the uncontrollable moorlands of the summit, and by farmlands and pasture on the slopes. Such remnants of the original forest as still exist are confined to stony escarpments or are enclosed as parklands.

New Plant Diseases

How new and more troublesome plant disease strains may arise in nature has been indicated by laboratory experiments on the black stem rust of wheat by a Canadian scientist, Dr. J. H. Craigie of the Dominion Experimental Farms at Winnipeg. Dr. Craigie told of his researches at the Congress.

Some time ago Dr. Craigie discovered that the fungus of black stem rust, in common with higher plants, has sex, and that it regularly passes through a sex phase in its reproductive cycle. Now he and his associates have demonstrated that various characters of this parasitic plant are transmitted from parents to offspring and are capable of being mixed and sorted by hybridization just as surely as were the smooth and wrinkled seed-coats of Gregor Mendel's famous peas. This holds true both for characters externally visible, like color of spores, and for characters that show up only in the physiological behavior of the fungus.

Spectroscope Analyzes Plant Food

The spectroscope, the same instrument used in analyzing the chemical

composition of stars trillions of miles away, is employed by Prof. H. G. Lundegardh, of Stockholm, to detect the smallest nibble that plants take of the mineral foods the earth provides them. Prof. Lundegardh burns the stems, leaves, roots and seeds of the plant to be investigated and passes the resulting light through the spectroscope. This separates the light into its spectrum and as each chemical element has its own particular lines, it is possible to measure the amount of the element present by observing the intensity of the lines. The spectrum is recorded on a photographic plate or, in the case of small amounts of minerals in the plant, a photoelectric cell is used as the light measuring device.

Elements such as sodium or potassium, which are extremely difficult to analyze chemically, can thus be quantitatively determined. Of some elements as little as one three hundred thousandth of an ounce can be detected.

Temperature Treatment

Just as human patients are often treated by keeping them at temperatures favorable for themselves but unfavorable to the germ of their particular disease, so sick plants can be helped and troublesome fungi hindered by the proper temperature treatment. Prof. L. R. Jones, of the University of Wisconsin, the American botanist upon whom was conferred one of the six honorary doctorates of Cambridge University awarded in connection with this Congress, reported his researches on temperature treatment of plant diseases. He and his associates found one cabbage disease that likes high temperatures. So the cabbage plants were grown under conditions as cool as possible and the disease was outwitted. A tobacco disease hated heat. So they raised tobacco under warm conditions and another disease was checked.

These experiments offer new hints to farmers who can govern the climatic conditions of their crops by late and early planting in open fields or by greenhouse cultivation.

This latter kind of inheritability of characters is especially important from the daily-bread point of view, for one of the things thus transmitted is the pathogenicity of the fungus, or its ability to damage the wheat plant.

Dr. Craigie's latest experiments are of interest as an indication of the possible road by which the large number of known physiological strains of black stem rust have come into being. Two physiological strains of the organism may look exactly alike under the microscope, yet one will attack only Marquis wheat and the other only Turkey Red.

There are about 100 known physiological strains, which complicates the rust-fighting problem considerably. Dr. Craigie considers it probable that many of the existing strains occurring in nature are of hybrid origin. Supporting evidence for this theory is offered by the fact that there are many such strains in America, where natural conditions for hybridizing the fungus are favorable; whereas in Australia where hybridizing is not favored by nature, there are relatively few physiological strains.

The danger of new and more vicious forms of wheat rust arising by natural hybridization is held out. Most of the hybrids he produced were intermediate in virulence between their parent stocks, Dr. Craigie says; but some were less virulent than either. If such a shift can occur, there are sound theoretical grounds for supposing that an equal shift toward greater virulence can also take place.

Color at Freezing

The natural fruit colors of certain canned fruits are preserved much better when the cans are kept in cold storage than when they are kept at ordinary temperatures.

T. N. Morris and J. M. Bryan of the Low Temperature Station, Cambridge, have recently found that canned strawberries stored for three months at a temperature just above freezing have a fine red color, whereas those kept at 10 degrees below zero Fahrenheit are pale, and those stored at ordinary room temperature are also somewhat pale.

The strawberries from cans stored at just above freezing actually had a much better appearance than when they were first canned because the color had returned to the fruit from the syrup.

Science News-Letter, September 6, 1930

This Test Has Been Good for 24 Years — Try it—it proves the superiority of Kewaunee Laboratory Furniture



Chemistry Table
No. D-764

If you want to learn why such schools as Yale, Dartmouth, Vassar, University of Chicago, University of Wisconsin and hundreds of other fine schools choose Kewaunee Laboratory Furniture—or why Du Pont Rayon Company, Kellogg Food Products Company, Youngstown Steel Tube Company and a great many more of the nation's finest commercial and industrial laboratories, equip with Kewaunee Laboratory Furniture, apply the "Comparative Test."—It's a test that buyers have used for over 24 years.

The "Comparative Test" quickly demonstrates Kewaunee leadership. It proves that Kewaunee keeps step with the progress of science—that Kewaunee offers newer features of design, newer arrangements that promote greater efficiency, economy and utility—newer conveniences that save time and effort, newer and better methods of construction and newer developments in materials to provide more years of "cost free" service. The moderate prices of this superior equipment make it the greatest value in its field.

WRITE FOR KEWAUNEE BOOK

Kewaunee makes Laboratory Furniture for every conceivable laboratory purpose and for large or small laboratories. The complete line of 500 standard pieces is pictured and described in the Kewaunee Book—write for a copy of this 455 page book today. It's yours for the asking. All we ask is that you make your request on your organization's letterhead.



Instructor's Table
No. F-1119



Storage Case No. G-1358



Two Student Science Table No. D-609

Kewaunee Mfg. Co.
LABORATORY FURNITURE EXPERTS

C. G. CAMPBELL, Pres. and Gen. Mgr.

206 Lincoln St.,
Chicago Office:
14 E. Jackson Blvd.

Offices in Principal Cities

KEWAUNEE, WISC.

New York Office:
70 Fifth Ave.

Eclipse Arrived Early

THE total eclipse of the sun visible in California last April 28 was 1.7 seconds early. At the meeting of the American Astronomical Society in Chicago at the Adler Planetarium and Astronomical Museum, Dr. Edison Pettit, Mt. Wilson Observatory astronomer, told of the determination of the time that he and his colleague, Dr. Seth B. Nicholson, made from a talking movie news reel.

The movies were made from Honey Lake, Calif., where the Mt. Wilson party was stationed. They were made at the rate of twenty-four pictures a second, and in the sound track along the side of the film were recorded Dr. Pettit's counts of the time. From the film Drs. Pettit and Nicholson have found that the middle of the eclipse occurred at 19 hours 5 minutes 51.4 seconds, Greenwich Civil Time, which is five hours ahead of Eastern Standard Time. The predicted time for the Mt. Wilson station, allowing for the 4,000 foot altitude, was 19 hours, 5 minutes, 53.1 seconds.

Astronomy

Science News-Letter, September 6, 1930

NATURE RAMBLINGS

By Frank Thone



Waiting for a Break

With very few exceptions, man's cultivated food plants have been in use since prehistoric times. When they come to us as "new" products, like dasheens or alligator pears, it merely means that they have been cultivated and used by people somewhere else since time immemorial and have just recently started on their travels. They may be new to us, but they are certainly old to somebody else.

Most of the cultivated plants of the world are improved editions of

wild plants that originally grew (and frequently still grow) in those regions where man first ceased to be a savage hunter and food-gatherer and became a civilized herdsman and cultivator. Most of our cereals, vegetables and fruits, therefore, can be traced to such centers of ancient civilization as the eastern end of the Mediterranean, the valley of the Ganges and the Andean plateau. These have given us wheat, rice and corn; onions, oranges and potatoes.

But in regions where man remained savage longer, depending still on what wild food he could gather, there are plants on which he used to depend to a considerable extent that are doubtless only "waiting for a break" to prove their worth as additions to our menu. The Indians of our western plains, for example, gathered the wild berries of the ground-cherry, the black nightshade and the wolf-grape. The pioneer mothers of Iowa and the Dakotas and Kansas, two and three generations ago, made acceptable jam and pies of these same wild fruits, until stocks of cultivated berries and trees could be established. Since then they have again been neglected, save for such brief flashes in the pan as Burbank's Wonder-Berry, which was nothing but the common black nightshade put through a brief course of breeding. There must be good in these wild fruits. Who will bring it out?

Horticulture

Science News-Letter, September 6, 1930

THE WISTAR INSTITUTE BIBLIOGRAPHIC SERVICE

is of invaluable assistance to

Investigators—Librarians—Teachers

It brings to them, in AUTHOR'S ABSTRACT form, a brief review of all original papers on Biological Subjects which appear in the following journals:

Journal of Morphology and Physiology
The Journal of Comparative Neurology
The American Journal of Anatomy
The Anatomical Record
The Journal of Experimental Zoology
American Journal of Physical Anthropology

The American Anatomical Memoirs
Folia Anatomica Japonica (Tokio, Japan)
Stain Technology (Geneva, N. Y.)
Physiological Zoology (Chicago, Ill.)
Publications of the Biological Survey of the Mount Desert Region

Advance Abstract Sheets

issued semi-monthly, bearing Author's Abstracts without bibliographic references, offer a practical means of making research immediately available in abstract form and of purchasing articles of special interest in reprint form without the necessity of subscribing to all the journals. Subscription \$3.00 per year

Bibliographic Service Cards

with complete bibliographic references, printed on Standard Library-catalogue cards, are of value and assistance to librarians and investigators. Subscription \$5.00 per year

Abstracts in Book Form

Abstracts referred to above are brought together periodically in book form with Authors' and Analytical Subject Indices. Price \$5.00 per volume with liberal discount to regular subscribers to the Bibliographic Service Cards.

Subscriptions to the Bibliographic Service and orders for reprints should be sent to

THE WISTAR INSTITUTE OF ANATOMY AND BIOLOGY

Thirty-sixth Street and Woodland Avenue :: Philadelphia, Penna. :: U. S. A.

Lions in Alaska

ALASKA, with its vast herds of caribou, its foxes and beaver, its mountain sheep and goats and its great bears, black, brown, grizzly and white, is one of the world's game paradises; but a hundred thousand years ago, long before the slow-witted men who then inhabited Europe thought to follow them, the peninsula (then an isthmus to Asia) teemed with great beasts that are only fossils now. There were huge, earth-shaking elephants with tusks a dozen feet long, magnificent, maned lions, and the high-shouldered ancestors of our modern bison. A bit of this great zoological heira from the Old World to the New has been caught in a painting by Mrs. E. Rungius Fulda, and is reproduced on the cover of this week's SCIENCE NEWS-LETTER through the courtesy of Natural History.

Paleontology

Science News-Letter, September 6, 1930

Top of World—Continued

for the application of all scientific data. Although it will be very foggy in the Arctic in July and August, my experience shows that the sun will be seen enough for observing purposes. This fog, which is a great menace to aerial navigation and handicapped Amundsen in the "Norge," will have no effect on the submarine.

"Soundings will also be made on the trip by the sonic depth finder, and this can be done while the vessel is in motion. Wilkins has already made the deepest sounding in the Polar sea, nearly three and a half miles, measured in 1927. Sir Hubert also hopes to carry an observation balloon which can be sent up with a camera so that pictures of the ice fields can be taken.

"This opportunity is so unique and possesses such splendid possibilities for systematic observation that it cannot fail to add enormously to the store of information about the Arctic. The one great advantage of the submarine is that it can go in the summer to any place in the Arctic ocean carrying all necessary scientific apparatus. An ice breaker is its nearest rival, but the ice breaker cannot go far because its radius of operation is greatly limited by its big engines and small fuel capacity."

Science News-Letter, September 6, 1930

Indians of California had organized school systems with elementary and higher instruction in ceremonial and religious matters, long before white men came into their country, is the finding of an anthropologist at the University of California.

Wood alcohol, or methanol, is poisonous regardless of whether it enters the body by the mouth, the lungs, or skin.

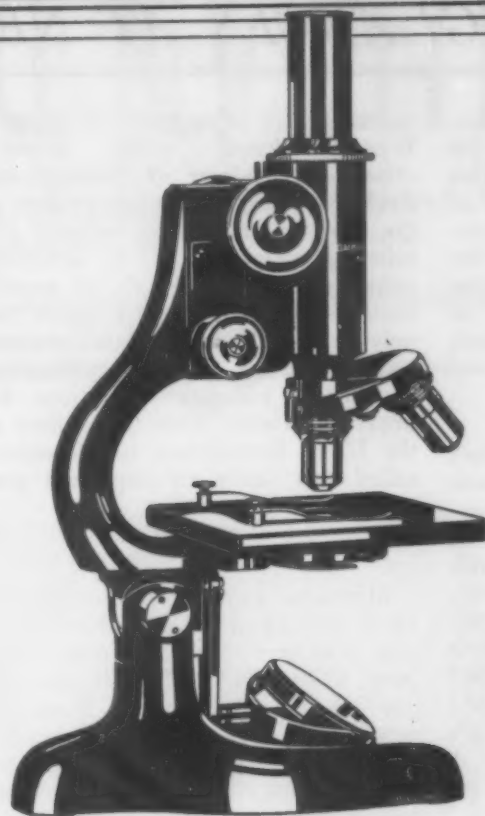
March's Thesaurus Dictionary

Finds the word you have forgotten, and defines it.

See full description in full page advertisement, issue of June 28, 1930.

Write for "How Dr. Johnson Would Marvel", an entertaining little booklet tracing a single word through our language.

Historical Publishing Co.
Dept. SC-9, 1334 Cherry St., Phila., Pa.



A Microscope for General Utility

Many times a microscope is required for purposes that demand neither the highest power nor critical illumination. In these cases an instrument that is lower in price than most laboratory microscopes will often suffice.

The B & L Microscope FS is an instrument that has the same sturdy build and mechanical and optical precision of the more complete laboratory instruments. The difference lies in the optical equipment available. This consists of a 10 \times and a 43 \times objective together with a 5 \times and 10 \times eyepiece. The 10 \times objective is divisible, making a 4 \times objective with the lower element removed. Thus a range of magnifications from 20 \times to 430 \times is available.

Microscope FS finds its chief application in the laboratories of secondary schools, though it performs satisfactorily for many other uses.

Write for complete description.

BAUSCH & LOMB OPTICAL CO.,
644 St. Paul St., Rochester, N. Y.
Makers of Orthogon Eyeglass Lenses for Better Vision



BAUSCH & LOMB

FIRST GLANCES AT NEW BOOKS

DIABETES—Benjamin F. Smith—*Appleton*, 223 p., \$2. Directions for treatment by insulin and diet. This practical book is composed largely of diet lists, recipes and a list of substitute foods. A feature of the diet lists is that they are so arranged that the carbohydrate content may be changed without changing the protein or caloric value.

Medicine—Dietetics

Science News-Letter, September 6, 1930

AMERICAN CIVIC ANNUAL—Edited by Harlean James—*American Civic Association*, 340 p., \$3. Seventy-seven experts discuss national parks, housing, regional planning, state civic enterprises, and city and town projects for civic betterment, in this second annual record of recent civic advance. As a handbook to the trend toward better living, working, and playing conditions in America, this volume serves a useful purpose. A who's who in civic achievement is included.

Sociology

Science News-Letter, September 6, 1930

CANADIAN GEOGRAPHICAL JOURNAL—*Canadian Geographical Society*, Montreal. So auspicious has been the beginning of this new highly illustrated periodical of Canadian science, travel and natural beauty that it has been necessary to make a reprinting of 4,500 copies of the May 1930 issue which is volume one number one. One feature of the first issue is an article by Dr. F. G. Banting of insulin fame describing in text and oil paintings his recent visit to the Canadian Arctic.

Geography

Science News-Letter, September 6, 1930

SOUTHERN BAFFIN ISLAND—Edited by A. E. Millward—*Dept. of the Interior, Ottawa*, 130 p. An account of exploration, investigation, and settlement in this far northern Canadian land, covering a period of 50 years.

General Science

Science News-Letter, September 6, 1930

SIMPLIFIED AERODYNAMICS—Alexander Klemm—*Goodheart-Willcox*, 323 p., \$3.50. A text for beginning courses written by the professor of aeronautical engineering at New York University.

Aeronautics

Science News-Letter, September 6, 1930

PROSPERITY RESERVES OF PUBLIC WORKS—Vernon Arthur Mund—*American Academy of Political and Social Science*, 49 p. A review of the theory of stabilizing industry and relieving unemployment by deferring public work until periods of general business depression. The author not only reviews the history but comments on the present practical applications and makes concrete suggestions for improving them. Otto T. Mallery of the U. S. Department of Commerce called this study an important contribution to the subject.

Economics

Science News-Letter, September 6, 1930

METHODS AND STATUS OF SCIENTIFIC RESEARCH—Walter Earl Spahr and Rinehart John Swenson—*Harpers*, 533 p., \$4. "Methods and Status of Social Science Research" would have been a happier title. Research in the physical and biological sciences with their important industrial applications is but lightly touched upon. Much more attention is given to the utilization of literature than to the unearthing of new fundamental facts. Nevertheless those engaged in other fields than the social sciences can profit from the discussions and information contained in this heavily documented volume.

Social Sciences

Science News-Letter, September 6, 1930

INTERNATIONAL MEDICAL ANNUAL—Carey F. Coombs, A Rendle Short, and others—*Wood*, 598 p., \$6. The forty-eighth year of this dictionary of practical medicine. The year's developments in the treatment of disease are reviewed by many distinguished contributors. The book is for physicians and surgeons and not for the layman.

Medicine

Science News-Letter, September 6, 1930

THE SKELETAL REMAINS OF EARLY MAN—Ales Hrdlicka—*Smithsonian Institution*, 379 p., 93 pl., \$2.25. In the *SCIENCE NEWS-LETTER* of August 16, a review of this valuable contribution to the Smithsonian Miscellaneous Collections gave the wrong publisher. It may be obtained at the Smithsonian Institution, and not at the Government Printing Office.

Anthropology

Science News-Letter, September 6, 1930

THE SEVEN SKIES—Harry F. Guggenheim—*Putnam's*, 216 p., \$2.50. A compilation of articles on the past, present and future of aeronautics written by the present American ambassador to Cuba who was formerly president of the Daniel Guggenheim Fund for the Promotion of Aeronautics.

Aeronautics

Science News-Letter, September 6, 1930

SOME SOCIAL ASPECTS OF MENTAL HYGIENE—Frankwood E. Williams and others—*American Academy of Political and Social Science*, 214 p. The papers comprising this volume fall into three parts: General aspects, mental hygiene in education and in mercantile life, and institutional treatment and community organization. There is also a book review department.

Mental Hygiene—Sociology—Education

Science News-Letter, September 6, 1930

INORGANIC PHARMACEUTICAL CHEMISTRY—Charles H. Rogers—*Lea and Febiger*, 676 p., \$7. A textbook for students of pharmacy who have had a foundation in general inorganic and qualitative chemistry. The practical directions should make the book useful not only for students but for practising pharmacists also.

Pharmacy

Science News-Letter, September 6, 1930

CHILD ADJUSTMENT IN RELATION TO GROWTH AND DEVELOPMENT—Annie Dolman Inskip—*Appleton*, 427 p., \$3. The book is an attempt to consider the subject with special reference to the child's adjustment during school years. It is comprehensive, readable, and should be helpful to the earnest teacher or parent.

Child Health—Psychology

Science News-Letter, September 6, 1930

A STUDY OF SOME CHARACTERISTICS OF VEGETABLE OILS—James B. McNair—*Field Museum*, 21 p. A brief summary and grouping of the classes of vegetable oils according to their various properties, followed by tables giving saponification values, specific gravities and iodine numbers of a large number of oils, fats and waxes, and a table of oil-producing plants arranged in botanical order by families.

Chemistry

Science News-Letter, September 6, 1930